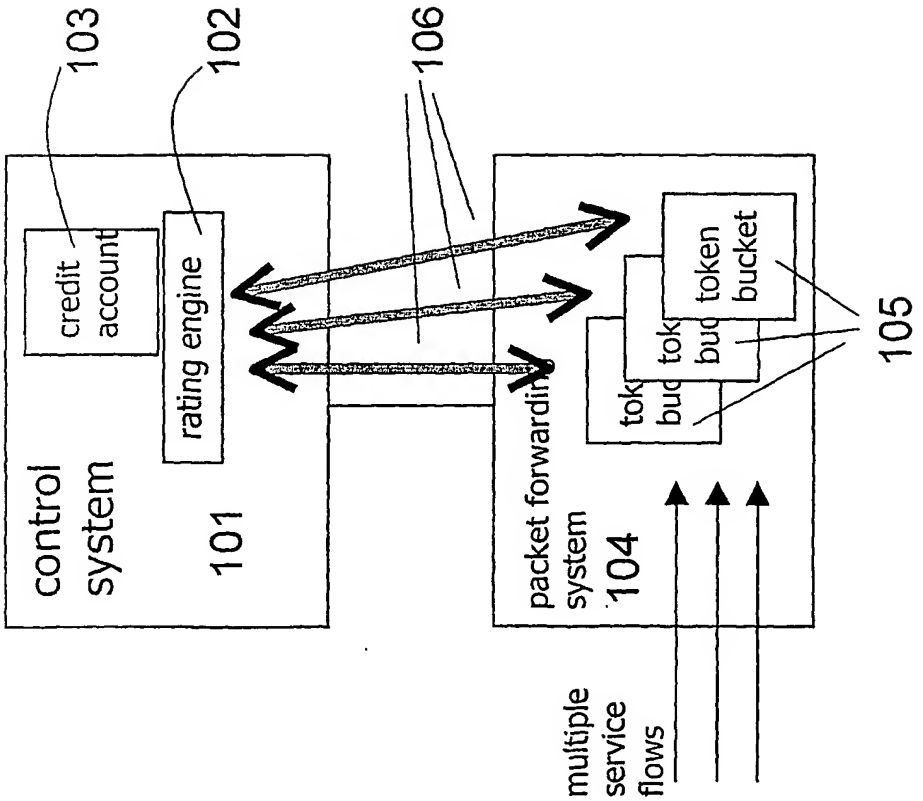
103
102
106
credit account
rating engine
control system
101
packet forwarding system
104
token bucket
105
multiple service flows

Fig. 1

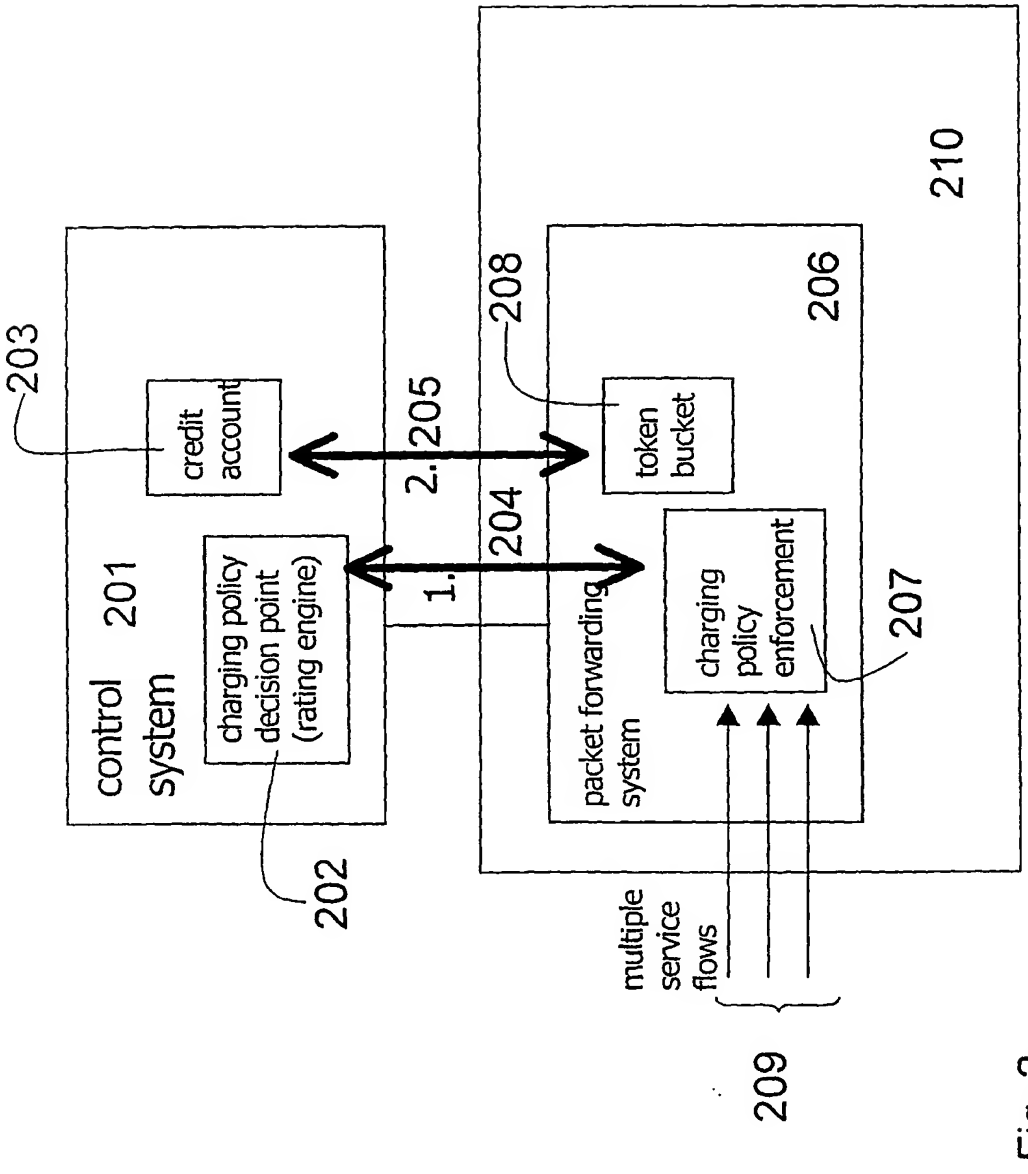
203
credit account
control system
201
charging policy decision point (rating engine)
202
2.
205
1.
204
208
token bucket
206
packet forwarding system
charging policy enforcement
207
210
multiple service flows
209

Fig. 2

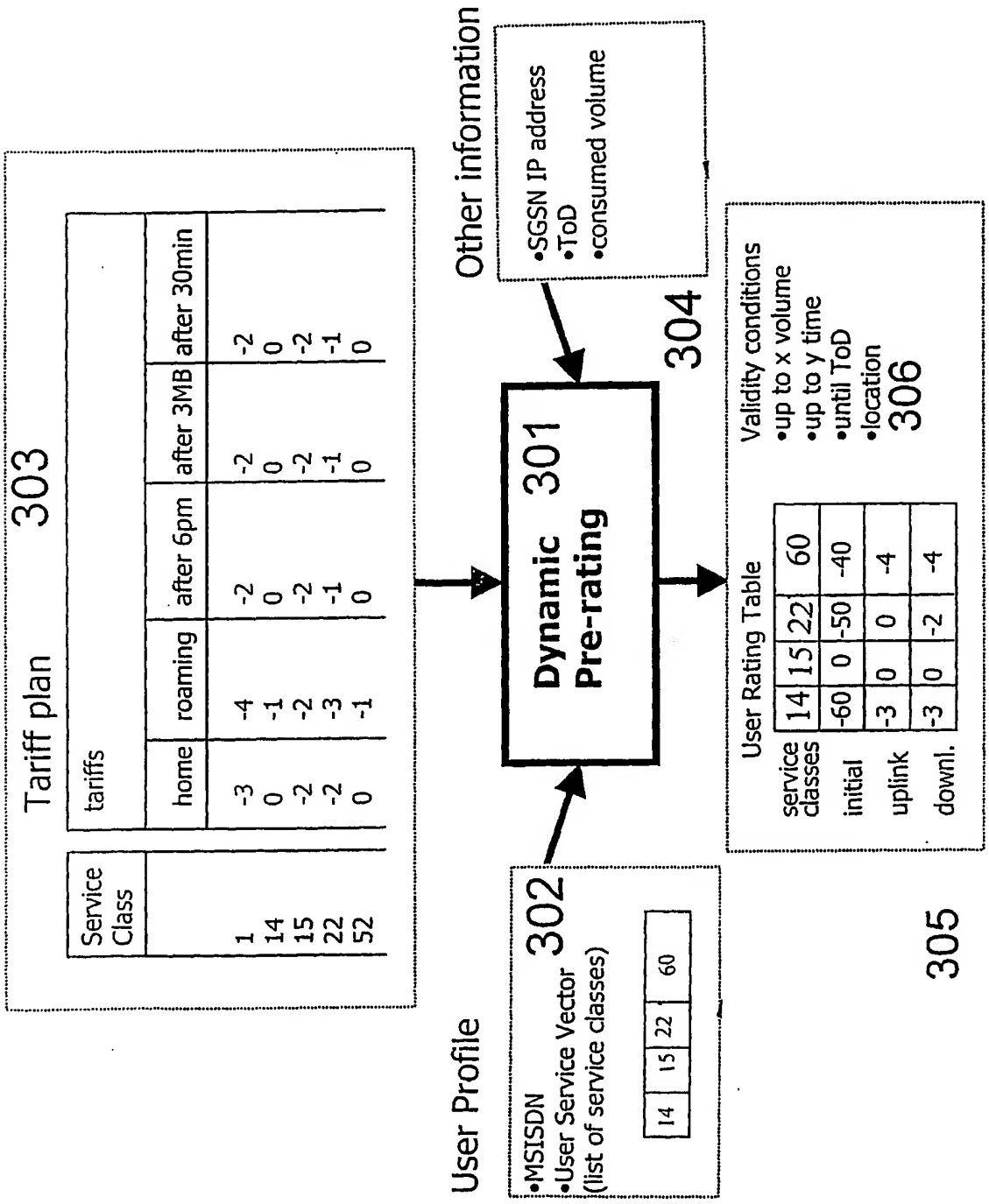
Tariff plan
303
Service Class
tariffs
home
roaming
after 6pm
after 3MB
after 30min
1 -3 -4 -2 -2 -2
14 0 -1 0 0 0
15 -2 -2 -2 -2 -2
22 -2 -3 -1 -1 -1
52 0 -1 0 0 0
Other information
•SGSN IP address
•ToD
•consumed volume
User Profile
302
•MSISDN
•User Service Vector
(list of service classes)
14 15 22 60
Dynamic Pre-rating
301
304
User Rating Table
Validity conditions
•up to x volume
•up to y time
•until ToD
•location
306
service classes 14 15 22 60
initial -60 0 -50 -40
uplink -3 0 0 -4
downl. -3 0 -2 -4
305

Fig. 3

Fig. 4

400

User Rating Table 401

| Service Class | 14 | 15 | 22 | 60 |
|---|---|---|---|---|
| Initial rate values | -60 | 0 | -50 | -40 |
| Current rate values, up | -3 | 0 | 0 | -4 |
| Current rate values, down | -3 | 0 | -2 | -4 |
| Next rate values, up | -2 | 0 | 0 | -3 |
| Next rate values, down | -2 | 0 | -1 | -3 |
| Remaining volume | 1.35 | ... | ... | ... |

Validity Conditions 402

| | |
|---|---|
| Remaining time | 0:53:30 |
| Time for current rate | 14:00:00 |
| Time for next rate | 18:00:00 |
| Location | ... |

Fig. 5

User Profile

- MSISDN
- User Service Class Vector (list of allowed Service Classes)

| 14 | 15 | 22 | 60 |
|---|---|---|---|

- other data

Fig. 6

Tariff plan

| Service Class | Tariffs | | | | |
|---|---|---|---|---|---|
| | home | roaming | after 6pm | after 3MB | after 30min |
| 14 | 0 | -1 | 0 | 0 | 0 |
| 15 | -2 | -2 | -2 | -2 | -2 |
| 22 | 0 | -1 | 0 | 0 | 0 |
| 52 | -1 | -1 | -1 | -1 | -1 |
| 60 | -3 | -4 | -2 | -2 | -2 |

Fig. 7a

Service Filters

| Service Identifier | filter rule | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | filter prio | IP address/mask | TCP/ UDP | port# | proto col# | ICMP type | protocol | PIF pointer | Service Class |
| 1 | 1 | 100.18.0.0/16 | * | - | - | - | WSP | 1 | - |
| 2 | 2 | 100.18.0.0/16 | * | - | - | - | HTTP | 2 | - |
| 3 | 3 | 100.12.0.0 | * | - | - | - | - | - | 22 |
| 4 | 4 | * | * | - | - | - | - | - | 60 |

Fig. 7b

Protocol Inspection Filter (PIF) configuration

| PIF# | Identifier | Service Class |
|---|---|---|
| 1 | mms1.oper.net | 14 |
| 1 | mms2.oper.net | 14 |
| 1 | * | 15 |
| 2 | music.com | 52 |
| 2 | * | 53 |

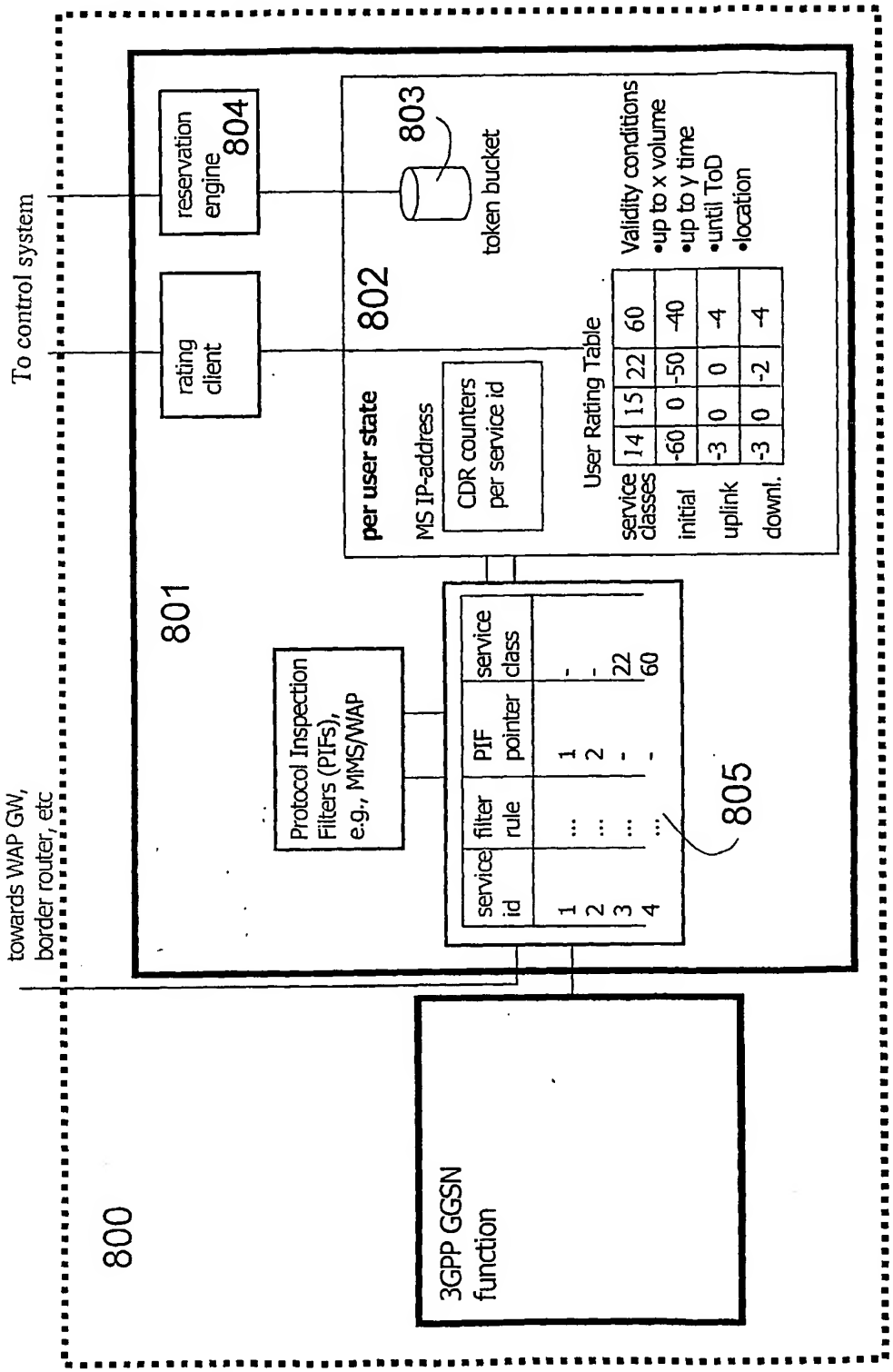
800
3GPP GGSN function
towards WAP GW, border router, etc
To control system
801
802
803
804
805
reservation engine
rating client
token bucket
per user state
MS IP-address
CDR counters per service id
Protocol Inspection Filters (PIFs), e.g., MMS/WAP
service id
filter rule
PIF pointer
service class
User Rating Table
service classes
initial
uplink
downl.
Validity conditions
•up to x volume
•up to y time
•until ToD
•location

Figure 8